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Appl. No. 10/754,371
Amdt. dated August 21, 2006
Reply to Office Action of April 19, 2006

PATENT

REMARKS/ARGUMENTS

Claims 1-30 are pending in this application. Claims 1, 3-8, 10-11, 13-18 and 20 are amended. New claims 21-30 have been added. Support for the new and amended claims can be found, for example, at FIGS. 15 and 16, and on page 31, line 16 to page 34, line 12. No new matter has been introduced.

Claims 1-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-20 of copending U.S. Application No. 11/056,520. Although Applicants do not agree with the double patenting rejections, Applicants submit an executed Terminal Disclaimer with respect to U.S. Application No. 11/056,520 and Statement under 37 CFR 3.73(b). Accordingly, withdrawal of the obviousness double patenting rejections is requested.

Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamamoto (U.S. Pat. No. 6,779,063). Applicants respectfully submit that independent claims 1, 4 and 6 as amended are patentable over Yamamoto because, for instance, it does not teach or suggest a storage device controlling apparatus including a plurality of first channel controllers, each of the first channel controllers being connected to a LAN and having a circuit board on which a file access processing section and an I/O processor are formed... wherein said apparatus further comprises: a file lock table to be used by the file access processing section of the first channel controllers to perform exclusive control, at a file level, on file requests received by the file access processing section; and a volume lock table to be used by the I/O processor of the first channel controllers to perform exclusive control, at a block level, on file requests received by the file access processing section; wherein when the plurality of first channel controllers shares a first logical volume, (1) if one of the first channel controllers receives a plurality of requests to input/output data in a file of the first logical volume, control is performed wherein the first channel controller performs an I/O process for one of the plurality of requests to input/output, during which data area of the file is locked with use of the file lock table, thereby prohibiting an I/O process for the others of the plurality of requests to input/output from being performed, and (2) if some of the plurality of first channel controllers receive a plurality of requests to

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input/output data in a file of the first logical volume, control is performed wherein an I/O process is performed for one of the plurality of requests to input/output, during which data area of the file is locked with use of the logical volume lock table, thereby prohibiting an I/O process for the others of the plurality of requests to input/output from being performed. This is described and shown, for example, at FIGS. 15 and 16, and on page 31, line 16 to page 34, line 12.

In other words, the above limitations disclose that for access competition in the same channel controller (that has a file access processing section and an I/O processor), the file access processing section can perform exclusive access control quickly on a file basis, with use of a file lock table. For access competition over a plurality of first channel controllers (that each has a file access processing section and an I/O processor), their I/O processors can perform exclusive access control on a block data basis, with use of a logical volume lock table. Thus, the file access processing sections of the plurality of first channel controllers need not communicate with each other.

Yamamoto merely discloses a file system having a lock manager that checks to determine whether or not access to a requested file is available. See Col. 6, lines 38-53; FIG. 3. Yamamoto also discloses that the file system and a block system can share a logical volume area. See Col. 4, lines 29-42; FIG. 6. However, there is no teaching in Yamamoto that when a plurality of first channel controllers shares a logical volume, (1) if a file access competition occurs in one of the first channel controllers, its file access processing section performs exclusive access control with use of a file lock table; and (2) if a file access competition occurs over some of the plurality of first channel controllers, their I/O processors perform exclusive access control with use of a logical volume lock table.

For at least the foregoing reasons, claims 1, 4 and 6 as amended, and claims 2-3, 5 and 7 depending therefrom, are patentable. Accordingly, Applicants respectfully request withdrawal of the rejection.

Claims 1-7, 10-17 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (U.S. Pat. No. 2004/0233910).

Applicants respectfully submit that independent claims 1, 4, 6, 10, 11, 14, 16 and 20 as amended are patentable over Chen et al. because, for instance, it does not teach or suggest

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a storage device controlling apparatus including a plurality of first channel controllers, each of the first channel controllers being connected to a LAN and having a circuit board on which a file access processing section and an I/O processor are formed... wherein said apparatus further comprises: a file lock table to be used by the file access processing section of the first channel controllers to perform exclusive control, at a file level, on file requests received by the file access processing section; and a volume lock table to be used by the I/O processor of the first channel controllers to perform exclusive control, at a block level, on file requests received by the file access processing section; wherein when the plurality of first channel controllers shares a first logical volume, (1) if one of the first channel controllers receives a plurality of requests to input/output data in a file of the first logical volume, control is performed wherein the first channel controller performs an I/O process for one of the plurality of requests to input/output, during which data area of the file is locked with use of the file lock table, thereby prohibiting an I/O process for the others of the plurality of requests to input/output from being performed, and (2) if some of the plurality of first channel controllers receive a plurality of requests to input/output data in a file of the first logical volume, control is performed wherein an I/O process is performed for one of the plurality of requests to input/output, during which data area of the file is locked with use of the logical volume lock table, thereby prohibiting an I/O process for the others of the plurality of requests to input/output from being performed.

Chen et al. merely discloses a device-level access protocol that transmits and responds to requests for data to be read or written to storage devices, and a file-level access protocol that allows shared access to files on a file system. See page 4, paragraph 39. However, there is no teaching in Chen et al. that when a plurality of first channel controllers shares a logical volume, (1) if a file access competition occurs in one of the first channel controllers, its file access processing section performs exclusive access control with use of a file lock table; and (2) if a file access competition occurs over some of the plurality of first channel controllers, their I/O processors perform exclusive access control with use of a logical volume lock table.

For at least the foregoing reasons, independent claims 1, 4, 6, 10, 11, 14, 16 and 20, and claims 2-3, 5, 7, 12-13, 15 and 17 depending therefrom, are patentable. Accordingly, Applicants respectfully request withdrawal of the rejection.

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Claims 8, 9, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Chiou et al. (U.S. Pat. No. 6,792,507), and further in view of Kurio (U.S. Pat. No. 5,774,640).

Applicants respectfully submit that claims 8, 9, 18 and 19 are patentable over the cited references because, for instance, they do not teach or suggest a storage device controlling apparatus including a plurality of first channel controllers, each of the first channel controllers being connected to a LAN and having a circuit board on which a file access processing section and an I/O processor are formed... wherein said apparatus further comprises: a file lock table to be used by the file access processing section of the first channel controllers to perform exclusive control, at a file level, on file requests received by the file access processing section; and a volume lock table to be used by the I/O processor of the first channel controllers to perform exclusive control, at a block level, on file requests received by the file access processing section; wherein when the plurality of first channel controllers shares a first logical volume, (1) if one of the first channel controllers receives a plurality of requests to input/output data in a file of the first logical volume, control is performed wherein the first channel controller performs an I/O process for one of the plurality of requests to input/output, during which data area of the file is locked with use of the file lock table, thereby prohibiting an I/O process for the others of the plurality of requests to input/output from being performed, and (2) if some of the plurality of first channel controllers receive a plurality of requests to input/output data in a file of the first logical volume, control is performed wherein an I/O process is performed for one of the plurality of requests to input/output, during which data area of the file is locked with use of the logical volume lock table, thereby prohibiting an I/O process for the others of the plurality of requests to input/output from being performed.

As noted above, Chen et al. fail to disclose the above features. Chiou et al. and Kurio fail to cure the deficiency. Chiou et al. merely discloses a cache storage network system that enables the sharing of resources among all assets in a storage network system. See Col. 5, lines 52-56. Kurio et al. merely discloses a network interface for connecting a computer to a network that prevents a single point of failure from impeding a host computer's access to the network. See Col. 2, lines 33-65. However, none of the cited references teaches or suggests that

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when a plurality of first channel controllers shares a logical volume, (1) if a file access competition occurs in one of the first channel controllers, its file access processing section performs exclusive access control with use of a file lock table; and (2) if a file access competition occurs over some of the plurality of first channel controllers, their I/O processors perform exclusive access control with use of a logical volume lock table.

For at least the foregoing reasons, claims 8, 9, 18 and 19 are patentable.

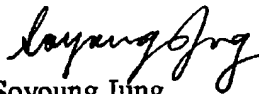
Accordingly, Applicants respectfully request withdrawal of the rejection.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,


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